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ABSTRACT

The utility of self-control procedures and covert sensitization as alternatives to rapid smoking in smoking cessation was tested in two studies. Subjects (N=33) were at least 21 and had smoked a minimum of one pack per day for five years or more. Relaxation training and discussion of goals were presented to subjects. In Study I, both groups received a self-control manual and coaching to develop individualized self-control strategies; one group also received covert sensitization. Results indicated that covert sensitization added nothing to the effects of the self-control package. In Study II, one group received the same combination as in Study I, while the second group received the basic package with cue extinction procedures. A third group received a combination of both sets of procedures. The higher abstinence rates for the self-control and cue extinction groups refelct improvements in the way meetings were conducted and procedures presented. The low abstinence rate for the combination group likely reflects problems associated with presenting too much material in the two weeks prior to cessation. (Author)

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Self-Control With and Without Covert Sensitization in Smoking Cessation*

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Washington University in St. Louis

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Self-Control With and Without

Covert Sensitization in Smoking Cessation

Abstract

Two studies tested the utility of self-control procedures and covert sensitization as alternatives to rapid smoking in smoking cessation. Subjects were at least 21 and had smoked at least one pack per day for at least 5 years. Relaxation training and discussion of goals were given in 3 meetings per week for two weeks prior to subject-chosen quit dates. A total of 10 sessions were held during the 90 days following cessation. In Study I, both groups received a self-control manual and coaching to develop individualized self-control strategies. One group also received covert sensitization. At 3- and 6-month follow-ups, 33% of those without and 26% of those with covert sensitization were abstinent. Covert sensitization apparently added nothing to the effects of the self-control package. In Study II, one group received the same combination of self-control manual and the basic package as in Study I. A second group received the basic package with cue extinction procedures designed to extinguish associations between desires for cigarettes and cues paired with previous smoking. A third group received a combination of both sets of procedures. At 3-month follow-up, 67% of each of the first two groups were abstinent while only 31% of the combination group were abstinent. The higher abstinence rates for the self-control and cue extinction groups reflect improvements in the way meetings were conducted and procedures were presented, as well as the virtues of those procedures. The low abstinence rate for the combination group likely reflects problems associated with presenting too much material in the two weeks prior to cessation.

Self-Control With and Without Covert Sensitization in Smoking Cessation

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This paper reports the development and preliminary results of a comprehensive self-control treatment for adult smoking cessation, a major goal of preventive medicine (U.S. Surgeon General's Report, DHEW, 1979). The self-control treatment has been developed in response to many unsuccessful smoking procedures and several successful ones with, unfortunately, difficulties associated with their widespread use. This background will be reviewed briefly before describing the nature of the self-control treatment and its testing.

Background Research

In spite of much effort to find an effective treatment for smoking cessation, the general status of the area is not much different than that described by Hunt and Matarazzo (1973) in their often cited review: those studies which report long-term results (6 to 12 months follow-up) frequently can boast no better than about 30% abstainers. One of the major exceptions

to these findings has been the procedure of rapid smoking, in which individuals smoke in a rapid and continuous manner (1 puff every 6 seconds) until no more smoking can be tolerated or for a fixed time limit (approximately 5 to 10 min.) repeated several times per session. Early reports of the effectiveness of this procedure have been encouraging, showing 6-month post-treatment abstinence rates in the area of 60% (Schmahl, Lichtenstein and Harris, 1972; Lichtenstein, Harris, Birchler, Wahl, & Schmahl, 1973). More recent studies have been mixed, some failing to achieve the same level of success (e.g., Danaher, 1977; Flaxman, 1978; Relinger, Bernstein, Bugge, Carmody, & Zohn, 1977) and others equalling the original findings (Hall, Sachs and Hall, 1979).

More troubling than mixed results, a number of authors have called attention to possible medical risks posed by rapid smoking, including elevated heart rate, elevated blood pH which results in a lower serum potassium level, increases in carboxyhemoglobin levels, reduced blood oxygen content, and possible EKG abnormalities (e.g., Horan, Linber, & Hackett, 1977). Controversy surrounds these concerns, but it is generally acknowledged that rapid smoking should not be used with persons suffering from pulmonary and cardiovascular disease. Similarly, people with emphysema, bronchitis, asthma, diabetes, and high blood pressure should also be excluded from the procedure unless they are under medical supervision. These restrictions in addition to some individuals' reluctance to receive such an unpleasant treatment as rapid smoking have prompted researchers to search for alternatives to this admittedly effective treatment. For instance, Lando (1977) reported such an alternative centered around continuous, normal paced smoking for 25 minutes

and a variety of group support and self-control procedures.

The research we report here has explored comprehensive self-control training and covert sensitization, an aversive procedure which relies on symbolic rather than physiological aversive stimuli, thereby eliminating medical risks as a factor in its use. In covert sensitization, subjects imagine behavior they wish to eliminate accompanied and/or followed by aversive images such as nausea, fear, bodily harm, etc. (Cautela, 1969). Several studies have utilized covert sensitization in smoking cessation programs (Gerson & Lanyon, 1972; Sachs, Bean, & Morrow, 1970; Sipich, Russell, & Tobias, 1974; Wagner & Bragg, 1970) but found undistinguished results. However, these were flawed by factors such as use of young, non-chronic smokers and lack of clarity as to whether participants were expected to quit, merely reduce, or not change daily consumption.

Another reason for exploring covert sensitization again was that it had been tested alone, without other treatment procedures to enhance or extend it. As Lando has noted, "interventions limited to aversive conditioning alone are not immune from the pervasive relapse so characteristic of smoking research" (1977, p. 361). In fact, Lando (1977) found that a comprehensive self-management package added substantially to his aversive continuous smoking procedure, resulting in 76% abstinence at 6-months as compared to 35% for the group which employed only the aversive component. Similarly, in regards to rapid smoking, Lichtenstein and Danaher (1976) have concluded that "the interpersonal/persuasive aspects of the treatment setting are a significant source of variance."

Self-Control Treatment

Following the reasoning described above, it was decided that a comprehensive self-control treatment should be administered in conjunction with covert sensitization. The self-control treatment was based on the Rachlin and Green model of self-control (1972). According to this model, self-control occurs in situations in which the individual is faced with a choice between a smaller but immediately available goal (e.g., a cigarette) and a greater, though substantially delayed goal (e.g., good health). The earlier that a person chooses between these two goals, the greater the probability of their choosing the long-term goal. Thus, early implementation of techniques that make the long-term goal more salient and/or decrease the attractiveness or availability of the short-term goal, leads to behavior patterns we label "self-control." From this model, we developed a didactic manual containing many examples of possible self-control manipulations and a variety of easy-to-remember principles (Fisher & Friedling, Note 1). The manual is used with group discussion of it and a series of exercises through which subjects are encouraged to develop their own specific self-control techniques and to apply them to their lives. Thus, this model of self-control differs from others in that there are given no specific "tips" nor assignments that certain procedures be used.

Other features of the comprehensive package included 1) target date quitting in which subjects set a target date during the second and third week of the program and prepare for it during the preceeding meetings (Flaxman, 1978); 2) relaxation training to help people cope with the tension and anxiety

frequently associated with the urge to smoke; 3) a procedure for graphing urges to smoke following cessation as a means of tracking progress toward the goal of quitting for 90 days. This last procedure was also based on the Rachlin and Green self-control model. By daily graphing of progress toward the goal of quitting for 90 days and of decreased urges to smoke, it was reasoned that the salience of that goal would be increased, encouraging choices consistent with it, i.e., not to smoke.

In order to test the effects of covert sensitization, Study I included two groups, one with and the other without covert sensitization. Both groups received all the other components of the self-control treatment just described. In Study II, reported subsequently, an improved self-control treatment was developed and implemented.

STUDY I

Method

Subjects

Subjects were 10 men and 23 women recruited by advertisement in local newspapers. All were at least 21 years of age, had smoked at least 5 years and smoked at least one pack of cigarettes per day. [illegible]s. All subjects were required to submit a refundable $20 deposit, portions of which were returned at each treatment session or at the end of the study. Subjects were randomly assigned to the two treatment conditions with consideration for schedule preferences when possible.

Measures

Subjects completed self-monitoring records of number of cigarettes smoked per day for 3 weeks prior to quitting, from the organizational meeting until

their quit dates. From then until 3 months after cessation, they completed forms indicating whether or not they had smoked since the previous meeting and, if so, how many. At the 6-month post cessation follow-up, subjects reported number of cigarettes they currently smoked per day.

Validity of reports of cigarettes smoked per day was assessed at cessation by measures of carbon monoxide in alveolar air and at 6-month follow-up by thiocyanate in saliva. In both cases, the self-reports were shown to be 100% reliable.

In addition to reports of smoking, subjects completed several personality measures and were assessed for pulmonary function and cardiopulmonary responses to mild activity. Results of these tests will be included in a subsequent report of this research.

Procedure

Clinic meetings were held 3 times per week for three weeks. Between the 5th and 7th of these meetings (1 1/2 to 2 weeks after the 1st), subjects quit smoking. Within this 5-day period, they could choose their own quit date, depending on the peculiarities of their own smoking habits as they might make one day or time better than another. Choices of quit dates were made by the 3rd meeting in order to foster a sense of commitment to them.

Self-Control Package

Prior to their quit dates, subjects were given the self-control manual described previously and were instructed in its possible applications. They also self-monitored all cigarettes smoked during this period in order to pinpoint times and situations when the self-control principles might best be

utilized. Subjects were also given relaxation training for 10-15 minutes at the end of each of the 6 pre-cessation sessions, and were instructed to use it as a self-control technique after their quit dates in order to help them cope with urges to smoke.

Before quitting, subjects were also given and taught how to use the 90-day graph for recording their daily number of urges to smoke for a full 90 days following their quit-dates.

Covert Sensitization Group

Subjects in this group were given the comprehensive self-control package described above and in addition were given instruction in the use of covert sensitization. At the end of relaxation training in each meeting, subjects were instructed to imagine smoking or being tempted to smoke along with coughing and choking or nausea and uncontrollable vomiting. After this, they were told to imagine putting out their cigarettes or forgetting their urges and feeling fresh and relaxed as an escape from the aversive images. Six trials were presented in each meeting from the 5th to the last meeting, 90-days after quitting. In addition, subjects were told to imagine for themselves a situation in which they were likely to smoke and to choose their own consequence which they personally found very aversive. They were instructed to use the covert sensitization outside of the treatment sessions as a self-control technique whenever they felt a strong urge to have a cigarette.

Maintenance Phase

During this phase, subjects met in groups and discussed the success and/or difficulty they had had coping with urges to smoke in a variety of situations. Subjects who had experienced setbacks were encouraged to analyze the circum-

stances under which the setback occurred, and were prompted to apply the self-control procedures, relaxation, and, if appropriate, covert sensitization more strictly in those situations. In addition, they brought their 90-day graphs to the sessions and discussed how the number of urges had decreased over time. Ten maintenance sessions were held during the 90-day period.

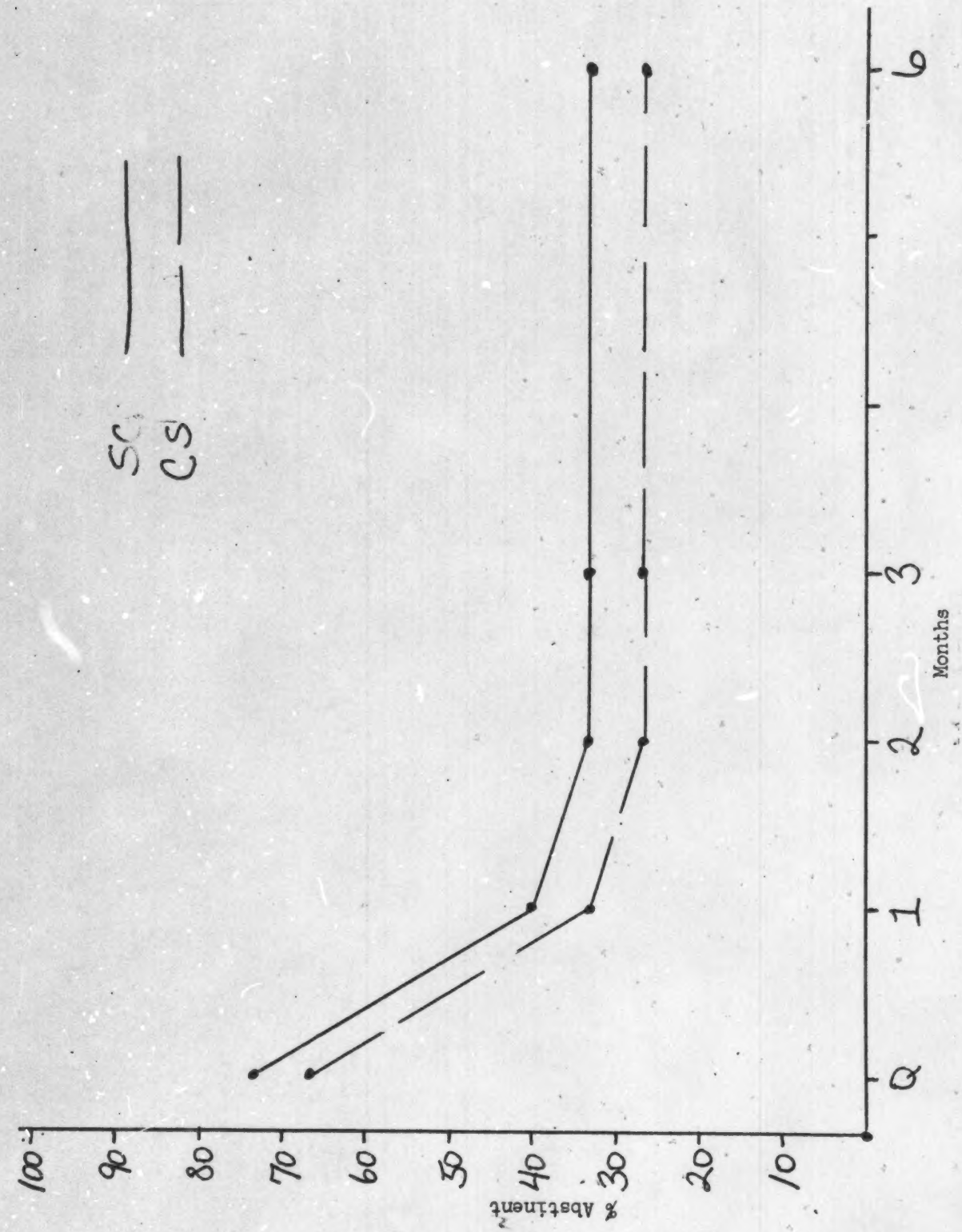
Results

At the 3-month follow-up, 33% of the subjects in the comprehensive self-control group (SC) and 26% of those in the covert sensitization and self-control group (CS) were abstinent. There were no additional relapses between 3 months and 6 months post-treatment. There was no significant difference between the abstinence rate of the two groups. Neither was there a significant difference between the two groups in terms of percent reduction in smoking achieved at 3- and 6-month follow-ups, relative to pretreatment baselines. Both these results are portrayed in Figures 1 and 2 on the following pages.

Discussion

The results of this study indicated that covert sensitization added little if anything to the comprehensive self-control treatment. This apparent lack of utility of this aversive conditioning procedure is reminiscent of the apparent lack of utility in smoking cessation of electric shock aversive conditioning (Russell, Armstrong, & Patel, 1976). The failure to find useful aversive conditioning procedures other than rapid smoking suggested the

Figure 1. Percent of subjects abstinent in each treatment group at 1, 2, 3, and 6 months post cessation in Study I.



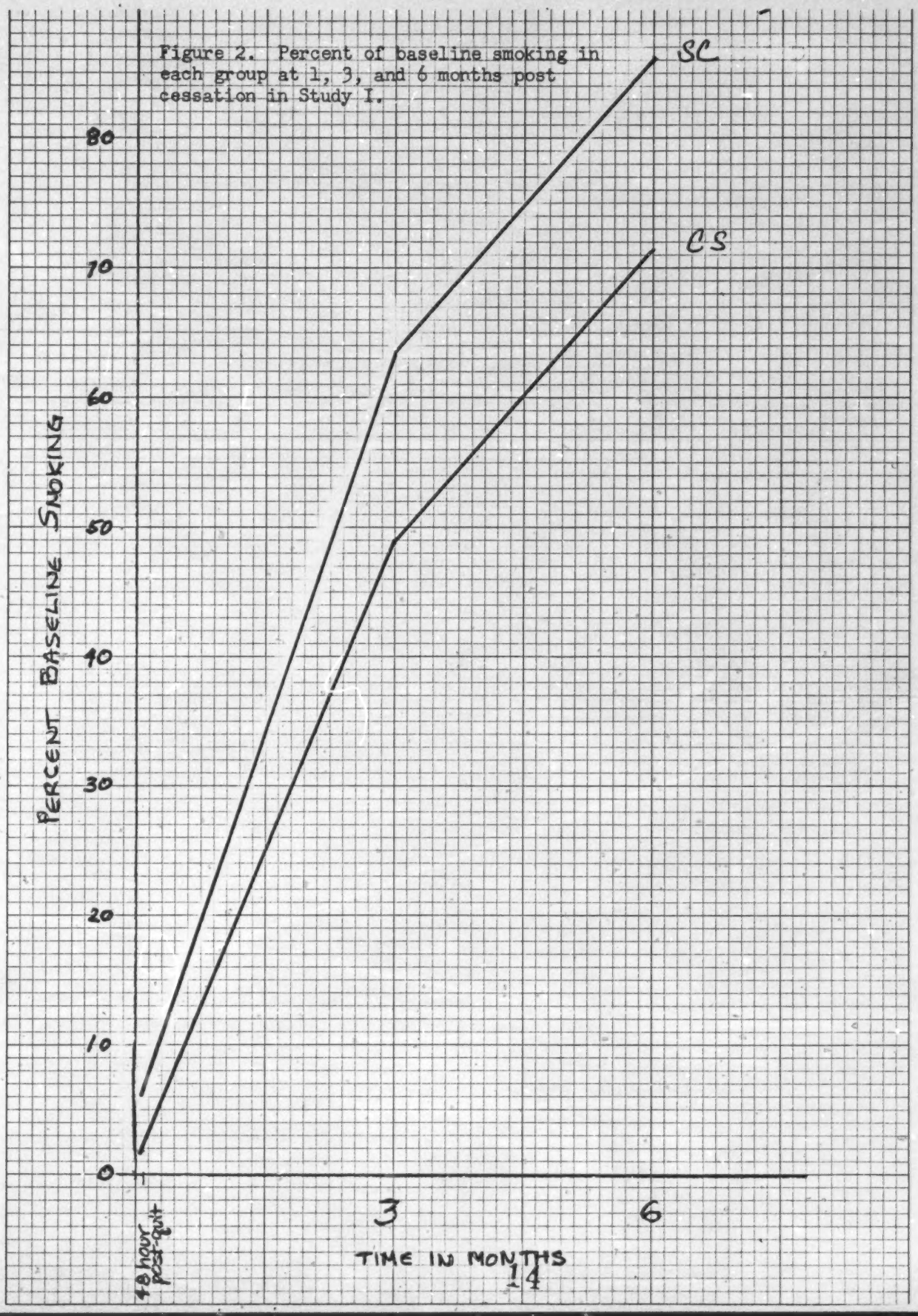


Figure 2. Percent of baseline smoking in each group at 1, 3, and 6 months post cessation in Study I.

pursuit of further alternatives to aversive conditioning in the second study, reported in the following.

STUDY II

A popular approach to behavioral weight reduction entails the elimination of as many cues and activities as possible from temporal or spatial proximity to eating (e.g., Stuart & Davis, 1978). In the present authors' own research, this procedure has been found useful and termed "Cue Extinction" (Fisher, Lowe, Morgan, Joffe, Dominik, & Green, Note 2). Cue extinction is designed to eliminate associations between eating and diverse, food irrelevant cues, thereby reducing the ability of those cues to evoke hunger, thoughts of food, etc. In order to improve the self-control package described in Study I, cue extinction procedures were adapted to smoking and tested in the present study.

Two cue extinction procedures were developed for use in smoking cessation. In the first, "cue extinction practice," subjects identify the three most prominent cues for smoking in their lives and systematically avoid smoking in the presence of those cues from the second treatment meeting until their quit date. Prominence is gauged by the frequency and reliability of the association between smoking and a given cue or by the strength of the urge provoked by a cue. With cue extinction practice, subjects may reduce the extent to which unimportant cues evoke urges to smoke. Importantly, this is done by practice before giving up cigarettes altogether. Thus, the impact of the strongest cues for smoking is reduced before subjects actually quit.

"Focussed smoking" was the other cue extinction procedure developed. It was designed to demonstrate that, when smoking is stripped of all social and

situational accompaniments, it is at best a neutral or even an aversive experience. Subjects sit and smoke for five minutes at their normal pace and in a normal manner, directed to focus their attention on the cigarette and the feelings of smoking. They are urged not to puff rapidly or do anything else to enhance the aversiveness of simply smoking for five minutes. The group leader repeats these instructions with matter-of-fact suggestions of aversive components of subjects' reactions (e.g., irritated throat) during focussed smoking. This is done at each of the 2nd through 5th treatment meetings, and twice a day by subjects outside of treatment meetings between the 2nd and 5th meetings. In combination, then, the two cue extinction procedures were designed to show that enjoyment of smoking is largely dependent on social and situational cues and to reduce the extent to which several of the more critical of such cues would be capable of evoking urges to smoke.

Method

Procedures were generally similar to those employed in Study I. Three groups were employed. A self-control (SC) group received the same self-control procedures employed in Study I SC. A cue extinction group (CE) received those self-control procedures without the self-control manual or training in developing self-control techniques but with both the cue extinction procedures, focussed smoking and cue extinction practice. A third, combination group (COMBO) received the self-control manual, training in self-control techniques,

both cue extinction procedures, plus the rest of the self-control procedures employed in Study I. Additionally, subjects in all three groups of Study II employed contingency contracts through which they managed reinforcers and/or punishers for non-smoking and/or smoking, respectively.

Several changes were made in general procedures given the disappointing results of Study I. Treatment sessions were run in a more didactic manner in order to increase the extent to which subjects carried out suggested procedures. This was also encouraged by explicit homework assignments distributed at each meeting. In recruiting subjects, greater emphasis was placed on the amount of effort and motivation to quit that would be necessary to make their participation worthwhile. Finally, the deposit required for enrollment was raised from $20 to $40, half of which was returned only if subjects attended both 6- and 12-month post cessation follow-up meetings.

Subjects in Study II were 28 males and 28 females, solicited through newspaper and television announcements, word-of-mouth, and professional referral. All were at least 21 years old and smoked at least one pack per day and for at least 5 years.

Results

As can be seen in Figures 3 and 4, CE and SC were quite successful as gauged by number of subjects abstinent at 3 months post cessation (67% in each group) and by percentage reduction of smoking from pretreatment. The differences among the three groups for the abstinence data were significant (Chi-square = 6.61, $df = 2$, p less than 0.05) indicating that CE and SC were different than the COMBO treatment. At three months post cessation, the percentage reduction data showed a significant effect over time ($F_{1,38} = 20.54$, p less than 0.001) but no significant treatment by time interaction ($F_{2,38} = 2.09$,

Figure 3. Percent of subjects abstinent in each treatment group at each week for first 13 weeks (3 months) post cessation in Study II.

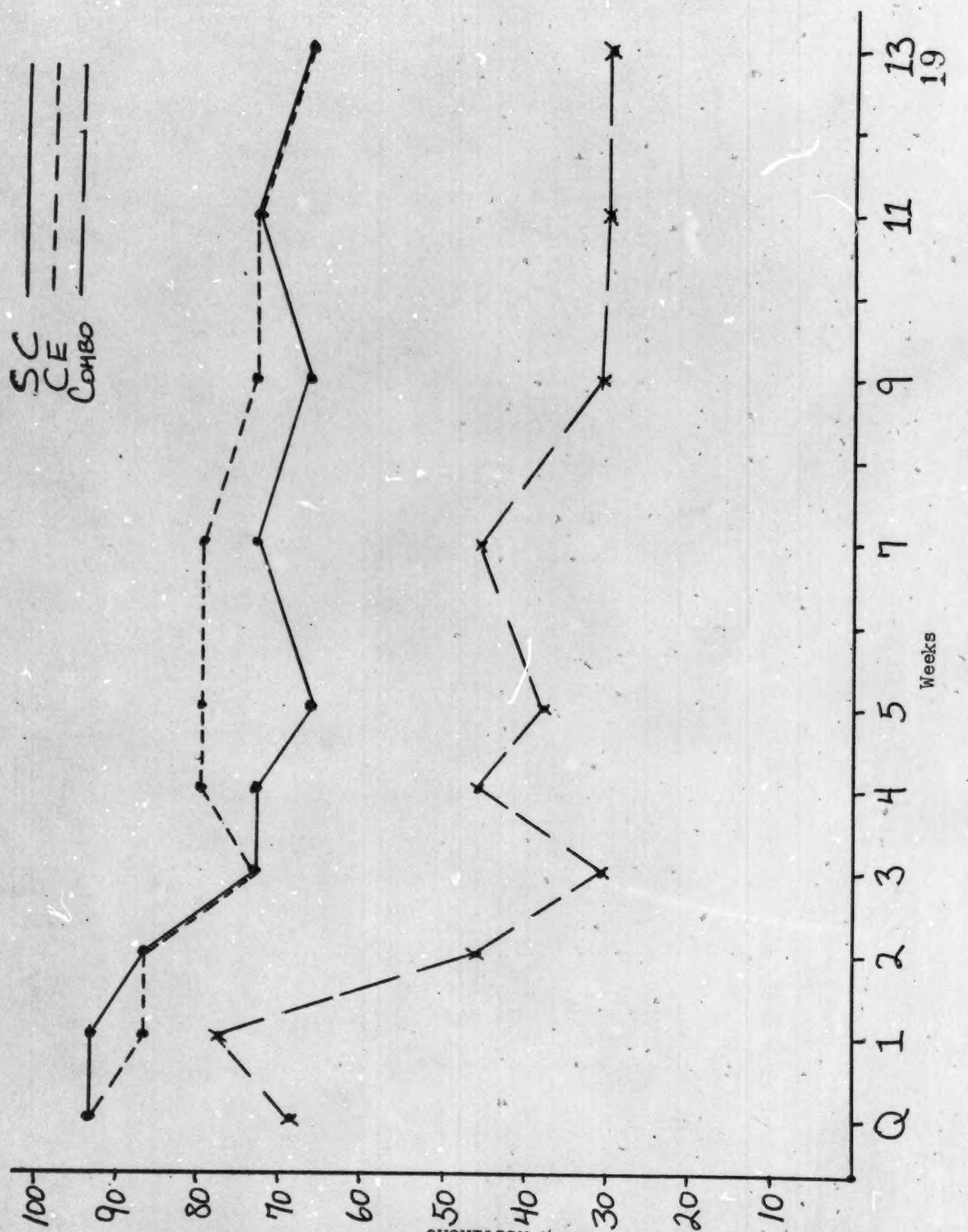
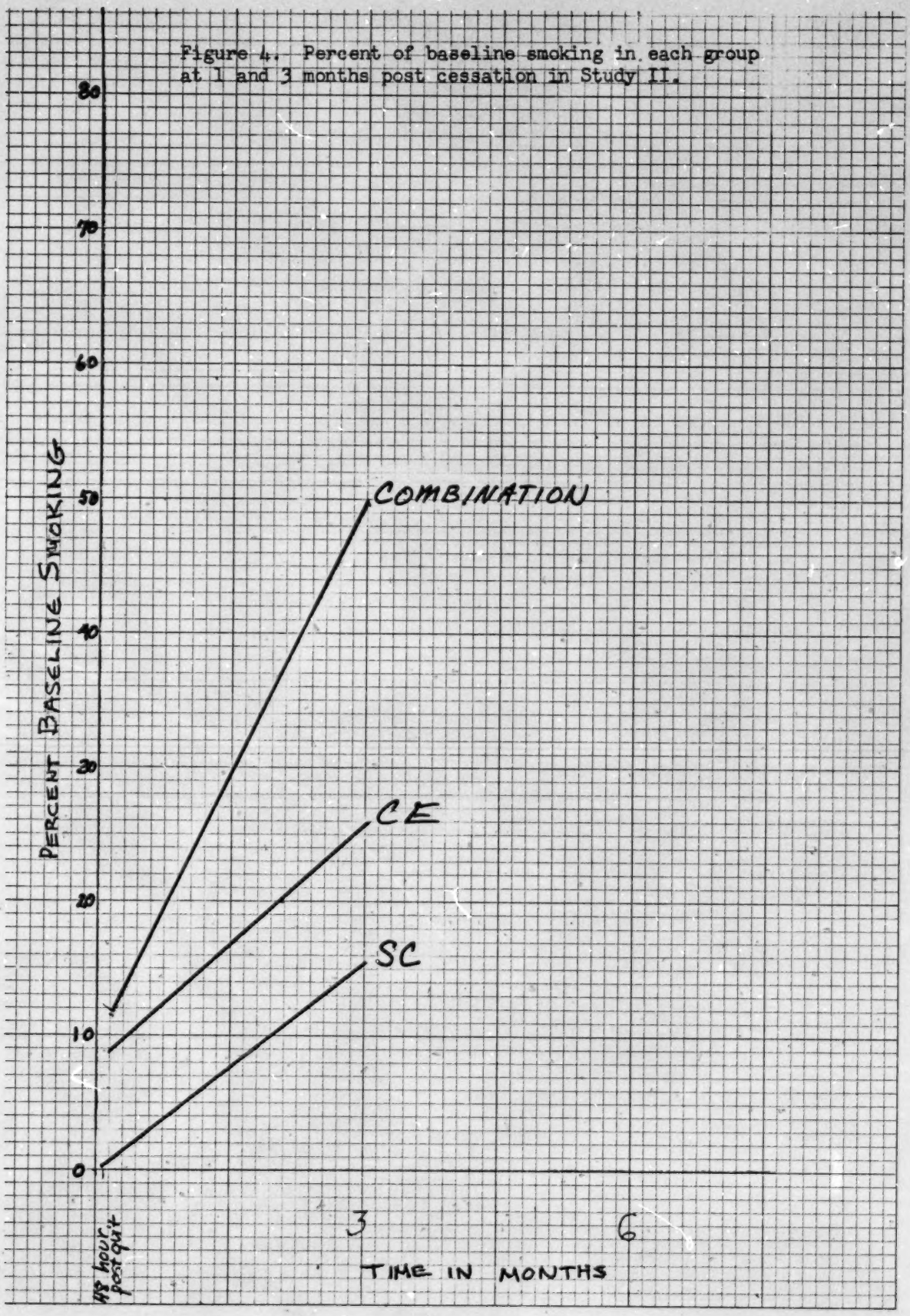


Figure 4. Percent of baseline smoking in each group at 1 and 3 months post cessation in Study II.



p less than 0.15).

Discussion

It appears that both CS and SC were effective procedures. Aggregating across both of these groups, 67% of subjects were abstinent at 3-month follow-up. (6-month follow-up will not be completed until September, 1979.) These procedures therefore command considerable interest in their potential as effective cessation techniques without aversive or medically risky components.

The failure of the COMBO to do as well as CE or SC is curious. This may reflect problems in condensing too much material into a limited number of treatment meetings. In the COMBO treatment, all the procedures used in both CE and SC were administered in the same number of sessions as employed in each of these less extensive treatments. Current research of the authors addresses ways in which scheduling and presentation of material may be improved to increase the efficacy of the COMBO.

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